

Five recognized by Dayton ASC chapter

by Fred Coleman, Materials and Manufacturing directorate

WRIGHT PATTERSON AFB, OHIO — Five scientists at the Materials and Manufacturing directorate were selected recently by the Affiliate Societies Council of the Engineering and Science Foundation for their 1999 Outstanding Engineers and Scientists Award.

Dr. Steven R. LeClair, Dr. Daniel B. Miracle, Dr. Lalgudi V. Natarajan, Dr. Richard L. Sutherland and Dr. Frank Szmulowicz were honored February 18 at the council's 40th Annual Outstanding Engineers and Scientists Awards Banquet.

LeClair was honored for technical leadership, being cited for farsighted vision and leadership which are the basis for a previously unimagined generation of materials processes and level of control. These processes enable the synthesis of tailored materials which have never been made before and which are designed for complex electronic or mechanical functions. LeClair created a process referred to as self-directed control, which allows changing of the behavior of polymer composite material.

Receiving his award in the research category, Miracle is an authority in the areas of advanced metals and metal matrix composites. His research led to the successful demonstration of a revolutionary alloy in advanced gas turbine engine vanes, which provide a 40 percent decrease in weight. By overcoming the major technical deficiencies in titanium matrix composites, Miracle's research has revolutionized the design of conventional gas turbine compressor cross-sections. These materials replace solid metal disks with thin rings, providing the single most dramatic improvement in thrust-to-weight of any innovation in gas turbine engine history over the past five decades. This technology has been successfully demonstrated in the Integrated High Performance Turbine Engine Technology program.

Natarajan also received his award in the research category. An authority in photochemistry and photo-sensitive materials, he developed technology based on switchable reflection filters formed using holographic liquid crystals. His discovery of a suitable formulation of materials has allowed the rapid and successful development of holographic filters from this technology. Natarajan has also applied this technology in the development of a detector badge for laser radiation. His research has long-range significance in numerous areas, including photonics, image processing and materials, optical computing and laser-hardened materials, and he has also been involved in the application of biotechnology toward the development of novel optical materials.

Known for his work on electrically switchable holograms and in the field of nonlinear optics, Sutherland was selected in the research category, as well. He was the first to suggest that polymer-dispersed liquid crystals might have applications in a laser protection device. Sutherland directs the research activities taking place in three different laser laboratories in the Laser Hardened Materials Branch, each using a variety of experimental techniques. In one lab, he developed a method for analyzing signals unlike any previously reported. For another lab, he developed a new technique for simultaneously characterizing the two-photon and excited-state absorption

cross-sections. In the third lab, he co-developed a pump-probe laser technique for measuring nonlinear optical response time using chirped pulses.

Szmulowicz received his award in the research category for expertise and leadership in electronic materials for infrared detector applications. Throughout his career, Szmulowicz has been a leader in materials and detector design issues, and he has constructed original physical theories, devised analytical solutions, and carried out high-accuracy numerical solutions. His predictions have been verified by experiments and have led to improved infrared detector designs and substantial cost savings.

The council's mission is to provide career and education opportunities for the engineering and scientific community. @